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NOTES ON PSEUDOSCORPIONS; A STUDY ON THE
VARIATIONS OF OUR COMMON SPECIES,
CHELIFER CANCROIDES LINN., WITH
SYSTEMATIC NOTES ON OTHER
SPECIES.

BY H. E. EWING,

AMES, IOWA.

(WITH PLATES I TO V.)

INTRODUCTION.

The pseudoscorpions constitute a small though well-defined group of the class Arachnida. They are typically arachnid in the possession of: first, a fused anterior portion of the body called the cephalothorax; second, in the organization of their mouth-parts; and third, in the possession of four pairs of legs. The pronounced segmentation of the abdomen, the constant possession of chelate chelicerae, the enormous development of the palpi, and the frequent absence of eyes are characters which would indicate their position among the *more* primitive members of Arachnida. On the other hand, the presence of an elaborate system of branched, tubular tracheae as well as the presence of spinning organs show that they differ essentially from the *most* primitive of the living members of the class.

The group is one that has never been very extensively studied. Prominent among the European workers might be mentioned: Menge,

who in 1855 published a rather extensive paper on the anatomy of the group, and also described and figured some of the more common forms, Simon, who in 1879 gave a description of the species then known to France, and Balzan, who in 1891 published an excellent classification of the pseudoscorpions and described many new species from various parts of the globe, but especially a large number from South America.

In North America the group has been sadly neglected and practically only two workers have made important contributions to its study. Mr. Nathan Banks has described many species from the eastern and middle states, and Mr. K. R. Coolidge has published a list of the North American species (see *Psyche*, December, 1908). Hardly any drawings have been published of our species and there appears to be some confusion in regard to the synonymy of a few of them. On this account and for the purpose of extending our knowledge of the geographical distribution of our forms, and last, though not least, in order to determine the range of variability in our commonest species, *Chelifer cancroides* Linn., this paper is written.

The writer's work is based on a large private collection, chiefly from the north central states; and upon a somewhat smaller though more representative collection in the possession of Cornell University. Though the Cornell collection is rather small, yet it contains specimens collected from many parts of the United States.

In the preparation of this paper the writer is indebted to Professor J. H. Comstock for the privilege of working up the Cornell collection, to Dr. A. D. MacGillivray also of the department of entomology for his many aids, and to Dr. Nathan Banks for comparing several named forms with the types which he possesses.

VARIATIONS IN THE HABITS OF *Chelifer cancroides* LINN.

This species varies much in its habits. In Europe it is found chiefly in houses, under wainscoting, under the dry straw and manure of chicken coops, between the loose leaves of old books, in outhouses, etc., and rather rarely under the bark of trees. Menge gives the following account of its habits:¹ "Man findet die Thiere selten in Wäldern unter Baumrinde, gewöhnlich in Häusern unter vermodern-

¹ Menge, A., Ueber die Scheerenspinnen, Chernetidæ, 1855, p. 31.

den Büchern, Kleidungsstücken, in Hühnerställen unter Strohabfällen und trockenem Koth, niemals da, wo es feucht ist." It is also reported to have similar habits by Simon, who regarded the species as probably being cosmopolitan:² "Cette espèce, répandue dans toute l'Europe, habite l'intérieur des maisons; on la trouve dans les coins obscurs, sur les boiseries, souvent dans les herbiers, même dans les boîtes de collection d'insectes; elle marche assez lentement et se cache dans les plus petites fissures. Dans ces conditions elle se trouve toujours isolément et rarement; elle a cependant été vue en nombreuse famille, par quelques observateurs, dans des ruches abandonnées, d'anciens nids de guêpes et des pigeonniers mal entretenus.— Le *C. cancroides* se trouve aussi, mais beaucoup plus rarement et accidentellement, sous des écorces d'arbres, même éloignées de toute habitation."

In this country *C. cancroides* is found most frequently under the bark of trees, rather than in the more artificial conditions surrounding the habitations of man. Under the bark of a single oak (*Quercus alba*), at Ames, Ia., I found scores of individuals. On this tree there was a regular colony of the species, and for many months I made frequent observations upon them. Just why they remained on this single tree when there were many others standing only a few feet away I could not determine. The leaves of the tree appeared to be infested with plant lice, and ants were at times constantly passing up and down the trunk to and from the lice. It may be that the pseudoscorpions fed upon the ants, but I never found any of them doing so. In our country this species is only rarely found in artificial conditions, that is, in dwelling houses, under old books, etc.

From these facts it would appear that America is the native home of this form, and not Europe, for here its conditions of life are more natural and in Europe they are more artificial. It must also be remembered that this is one of the very few of the species of this group which lives in artificial conditions. The native home of the pseudoscorpions was without doubt in the forests under bark, under logs where the ground was dry, beneath dry and matted grasses, etc. It is in these conditions that *C. cancroides* is most commonly found in this country and in these conditions some of its members are yet found no matter in what part of the world they are studied.

² Simon, E., Les Arachnides de France, VII, p. 24.

VARIATIONS IN STRUCTURE AND COLOR.—In order to study the variation in size, color and markings of this species, the following data are given in regard to the various collections obtained and examined.

Specimens Collected at Portage, Wis.—Two specimens, a male and a female, collected from under the bark of a conifer September 1, 1909, by the writer; and one male collected from a similar situation September 2, 1909.

Color: palpi very dark, hand darker than the other segments; cephalothorax dark.

Tooth-like projections present on the cephalothorax, but not present on the palpi. Movable digit of chelicerae but slightly curved; spinneret stout, straight, with five subequal barbs at its distal end.

Length: 2.8 mm.

Specimens Collected at Ames, Ia.—Many specimens, mostly collected by the writer in 1909 and 1910 in various situations. Many individuals were collected from under the bark of a single white oak (*Quercus alba*) which was badly infested with ants. Several hundred individuals were on this tree, the infestation being the most extensive I have ever observed.

Color: palpi dark, also the cephalothorax.

Cephalothorax in the case of nearly every specimen entirely without tooth-like tubercles, but in the case of a few individuals very small ones are present. They are absent from the palpi. Movable digit of chelicerae strongly curved.

Length: 2.5 mm.

Specimens Collected at Havana, Ill.—Three individuals, a male and two females, all collected from under the bark of trees standing in the shallow water of Illinois River at the point of its junction with Spoon River. The ancestors of these individuals probably were carried down to this point on drift wood from regions farther north.

Color: palpi and cephalothorax very dark, the hand darkest.

Cephalothorax without tooth-like process in the case of two individuals; one individual, a female, has some small ones on the cephalothorax. Palpi without tooth-like processes. Movable digit of chelicerae strongly curved.

Length: 2.5 mm.

Specimens Collected at Urbana, Ill.—Several specimens collected by Dr. J. W. Folsom and by the writer, mostly from under bark.

Color: in some specimens the palpi and cephalothorax are a dark chestnut brown, in others they are almost black; abdominal scuta light reddish brown.

Cephalothorax and palpi without the tooth-like processes in both the light and dark colored specimens.

Movable finger of chelicera lightly curved in the light colored specimens, but as the specimens become darker it becomes more strongly curved.

Length: 2.29 mm.

Specimens from Arcola, Ill.—Four specimens, three collected from under bark and one found in a dwelling house.

Color: general appearance a reddish brown; neither the cephalothorax nor the palpi dark.

Tooth-like tubercles only slightly indicated on the cephalothorax of one of the three bark specimens, but very pronounced on the cephalothorax and slightly indicated on the palpi of the specimen collected in the house.

Movable digit of chelicera but slightly curved. In the case of the house specimen its external margin straight. Prongs of spinneret well developed.

Length of bark specimens, 2.10 mm.; of house specimens, 3.00 mm.

Specimens Collected at Marshall, Ill.—Several specimens, all collected by the writer from under the bark of oaks.

Color: a reddish brown, darker on the cephalothorax and palpi but not very much darker.

But a very slight indication of the tooth-like processes on the cephalothorax, palpi without such indications.

Movable finger of the chelicerae but slightly curved; spinneret with very prominent prongs on its distal end.

Length: 2.10 mm.

Collections from Columbia, Mo.—An abundance of material collected by C. R. Crosby. No situations given, but the specimens were perhaps collected from various places.

Color: chestnut brown for the chitinized parts; palpi dark, but not as much so as they are in the Iowa and Wisconsin specimens.

Tooth-like tubercles absent from palpi, but indicated on the cephalothorax.

Movable fingers of chelicerae slightly curved.

Length: 2.38 mm.

Collections at Ithaca, N. Y.—Includes four specimens in the University collection. They appear to show variations among themselves.

Color: almost a uniform chestnut brown; abdominal scuta darker than usual.

Cephalothorax in all the specimens with rather prominent tooth-like tubercles, which in one individual extended to the trochanters and slightly upon the femora of the palpi.

Movable digit of the chelicerae but slightly curved.

Length: 2.50 mm.

Specimens from Borodino, N. Y.—Two specimens taken from a bee-hive.

Color: a rather light chestnut brown.

Tooth-like tubercles present on the cephalothorax and also indicated on the trochanters of the palpi.

Movable digit of the chelicerae almost straight on the outer side.

Specimens Collected at Otto, N. Y.—This collection includes a great amount of material taken from under a barn floor by Professor Comstock.

Color a light reddish chestnut brown, palpi but little darker than the body.

Tooth-like tubercles very prominent and reaching their greatest development. They are present on the cephalothorax of all the specimens and are also present to some extent upon the palpi, especially the trochanters, each of which has two prominent teeth on the posterior margin.

Movable digits of chelicerae with external margins almost straight; spinneret with moderate prongs.

Length: 3 mm.

Specimens Collected at Xenia, O.—This collection includes three specimens taken from under bark of white oak, one under bark of elm, and one each under the bark of wild cherry and black walnut.

Color: rather dark reddish brown. In one or two specimens the palpi are darkened in the region of the hand.

Tooth-like tubercles only slightly indicated, and that on the cephalothorax of one of the specimens from the oak, and on the one specimen from wild cherry.

Movable digit but slightly curved; spinneret with prominent prongs.

Length: 2.30 mm.

Chelifer muricatus from Austin, Tex.—Two specimens collected by Professor Comstock in the spring of '03.

These specimens certainly represent varieties of *C. cancroides* Linn. Hagen was strongly of this opinion, and my examination of these forms from Texas indicates clearly that they are transitional between our commonest type of *C. cancroides* Linn. and *C. scabriculus* Simon from California, the latter which must also be regarded as a variety of *C. cancroides*.

Color: reddish brown, head very dark. Tooth-like tubercles only indicated.

Movable digits of chelicerae slightly curved. Prongs of spinneret almost wanting.

A Specimen from New Mexico.—This was collected by E. J. Oslar at Albuquerque, N. M., on Sept. 10, 1903. No situation given. It may be regarded as belonging to the variety *muricatus* Say.

Color: cephalothorax dark; palpi a dark reddish brown, but lighter than the cephalothorax; abdominal scutæ and legs lighter than the palpi.

Tooth-like tubercles present on the cephalothorax, but only of a medium size. They are present on the trochanters of the palpi and here are moderately well developed, but are not present on the femora.

Movable fingers of the chelicerae but slightly curved.

A California Specimen.—A single specimen from Stanford University represents Simon's *scabriculus*, but is to be regarded as only a variety of *C. cancroides*.

Color: cephalothorax and palpi of a medium reddish brown.

Pedipalps stout; fingers short, not longer than the somewhat stout hand.

Tooth-like tubercles only slightly indicated on the cephalothorax and the trochanters of the palpi.

Movable digit of the chelicera rather strongly curved, but not so much so as in the case of the Iowa specimens.

Length: 2.60 mm.

Careful analysis of the preceding data shows that the following variations of *C. cancroides* exist.

1. In size the individuals range from the minimum length of 2.10 mm. to the maximum length of 3.00 mm.
2. In color we have variations from forms with very dark, almost black pedipalps and cephalothorax, to those with light yellowish brown pedipalps and cephalothorax.
3. The shape of the movable digit of the chelicera varies from a rather short, markedly curved form to one much longer and with the external margin almost straight.
4. There is a great variation in the size and number of the tubercles found on the dorsal surface of the cephalothorax and on the basal segments of the pedipalps. In the females of some collections these are practically absent, but in the well developed males of other collections they may number a score or more and are quite prominent (see Pl. II, Figs. 2, 3).
5. The lateral, posteriorly directed spurs of the abdominal scuta, found only in the case of the males vary greatly in number and size (see Pl. II, Figs. 6, 7, 8).

ADAPTATION OF VARIATIONS.

After making a careful study of the data given in these pages concerning the variations of this species, and the data collected by other writers, I have found the following adaptations of variation which may be confirmed by examining the data cited and the figures given on Plates I and II:

C. camcroides varies according to two prime factors; first, in regard to the situations in which it is found, and second, in regard to its geographical distribution.

In regard to situation the factors of nourishment and of mechanical adjustment to the conditions appear to be of great importance. Thus it is found that individuals (varieties) found under bark differ from those found in association with man and his various habitations in that they are much smaller, more flattened, have fewer and smaller tubercular processes on the cephalothorax and pedipalps, and have smaller chelicerae, with the movable digit more curved. This has, perhaps, resulted from a change in the kind of the food eaten. The size of those species found under bark is restricted greatly because they are compelled to move about in very narrow spaces, on the

other hand the forms found in dwelling houses, under barn floors, in fallen hay, etc., are not restricted as much in their movements and are much stouter.

In regard to the geographical distribution it may be stated that as a rule the northern forms are much darker than the southern, the Pacific coast variety has stouter pedipalps, with much shorter fingers (see Pl. II, Fig. 4); specimens from Texas and New Mexico are transitional between those found in California and those of the North Central States. Their pedipalps are considerably stouter than the pedipalps of the eastern forms, but not so stout as the pedipalps of the Pacific coast forms. The variety from the southwest should be called *muricatus* Say, and on the coast *scabriculus* Simon. The northern variety with the black pedipalps might be called *nigripalpus* n. var., and the forms with strongly developed tubercles on the cephalothorax and palpi, *dentatus* n. var.

THE SYNONYMY OF *Chelifer cancroides* LINN.

- 1761. *Chelifer cancroides* Linné. Faun. Suec., ed. XXI, 345.
- 1767. *Phalangium cancroides* Linné. Syst. Nat., edit. XII, p. 1028.
- 1778. *Chelifer europæus* De Geer. Mem. Ins., VII, p. 355, Pl. XIX, figs. 14-15.
- 1804. *Chelifer cancroides* Hermann. Mém. aptèr., p. 114.
- 1804. *Chelifer cancroides* Latreille. Hist. nat. des crust. & ins., VII, p. 141, Pl. VI, fig. 2.
- 1817. *Chelifer hermanni* Leach. Zool. Misc., III, p. 49, Pl. 142, fig. 3.
- 1821. *Chelifer muricatus* Say. Jour. Acad. Phila., II, p. 63.
- 1834. *Chelifer cancroides* Hahn. Arach., II, p. 52, fig. 139.
- 1834. *Chelifer ixoides* Hahn. Arach., II, p. 53, fig. 140.
- 1843. *Chelifer granulatus* Koch. Arachniden, Bd. X, p. 37, fig. 777.
- 1843. *Chelifer cancroides* Koch. Arachniden, Bd. X, p. 41, fig. 780.
- 1855. *Chelifer cancroides* Menge. Ueber die Scheerenspinnen, Chernetidæ, p. 30, Tab. IV, fig. 5.
- 1855. *Chelifer rhododactylus* Menge. Ueber die Scheerenspinnen, Chernetidæ, p. 32, Tab. IV, fig. 6.
- 1869. *Chelifer cancroides* Hagen. Rec. Amer. Ent., p. 51.
- 1869. *Chelifer muricatus* Hagen. Rec. Amer. Ent., p. 51.

1878. *Chelifer scabriculus* Simon. Ann. Soc. Ent. Fr., p. 154.
1879. *Chelifer cancroides* Simon. Arach. France, VII, p. 23, Pl. XVIII, fig. 2.
1891. *Chelifer degeneratus* Balzan. Ann. Soc. Ent. Fr., p. 532.
1895. *Chelifer cancroides* Banks. Jour. N. Y. Ent. Soc., III, p. 3.
1895. *Chelifer muricatus* Banks. Jour. N. Y. Ent. Soc., III, p. 3.
1895. *Chelifer scabriculus* Banks. Jour. N. Y. Ent. Soc., III, p. 4.
1899. *Chelifer cancroides* Tullgren. Ent. Tidskr., XX, p. 167, Tafl. I, fig. 1.
1908. *Chelifer cancroides* Coolidge. Psyche, December, 1908.
1908. *Chelifer scabrisculus* Coolidge. Psyche, December, 1908.

SYSTEMATIC NOTES ON VARIOUS SPECIES.

In the notes given in the following pages two new species are described, and there is also a complete description of *Chelifer cancroides*. Most of the species mentioned have never been figured before.

Chelifer cancroides Linn. (Pl. I and II, all Figs.).

Male.—General appearance a chestnut brown, but the hands, fingers and the cephalothorax darker than the rest of the body; legs slightly paler than the abdomen. Integument of the cephalothorax and first four segments of the palpi evenly tuberculate.

Chelicerae about as long as the distance between the eyes on the cephalothorax; movable digit with the outer margin almost straight; spinneret hyaline, about three times as long as broad and ending in four small cusps. Pedipalps rather long and slender; trochanter subglobose, but more projecting on the posterior side where it has a tendency to become angulate; from this point extends a rather prominent hair; femur slightly longer than the cephalothorax, constricted at its base and increasing slightly in width as you pass to the distal end; tibia almost as long and slightly wider than the femur, notched on its anterior margin at the base; hand as long as the tibia and about one and a half times as broad; fingers very slender, distinctly longer than the hand and evenly curved. The trochanter of the pedipalps is rather well clothed on its anterior surface, with short, stout almost clavate hairs; femur and tibia with fewer and more slender but similar hairs; hairs on the hand and fingers simple, and tapering, those on the fingers of two sizes, short numerous ones and about 5 very long tactile hairs on each digit.

Cephalothorax about one and a third times as long as broad; a single pair of eyes present, cornea distinct; two or three small chitinous tubercles present on each side of cephalothorax.

Abdomen considerably broader than the cephalothorax, broadest near its

middle and almost evenly rounded behind. From the posterior margin of each of the first six abdominal segments there projects backward a pair of spine-like tubercles situated near the lateral margins of the abdomen. These tubercles are the most prominent on the second and third segments. Abdominal scuta of almost equal thickness and covered with scale-like tubercles. Each scutum has a transverse row of ten, short, clavate hairs situated near its posterior margin. When the abdomen is viewed as a whole these hairs are seen to be arranged into longitudinal rows.

Legs stout; anterior pair longer than the first four segments of the pedipalps combined; last pair which is considerably the stoutest extending beyond the posterior margin of abdomen. The posterior coxæ are peculiar in possessing each a prominent, stout, curved spine on its anterior border equal in length to about one-third the width of the coxæ. Femur of leg four somewhat swollen, almost one-half as broad as long.

Length 2.25 mm.; breadth 1.20 mm.

Female.—The female differs from the male in being without the lateral, posteriorly directed spurs on the abdominal scutæ; in being without the chitinous spur on the last coxæ; and in having fewer and smaller hair-bearing, tooth-like tubercles on the cephalothorax.

This description is drawn from specimens which do not show the extremes of variation.

***Chelanops corticis*, new species** (Pl. III, Fig. 9).

Male.—A dark species. Pedipalps almost black; cephalothorax a very dark brown; abdominal scuta dark.

Chelicerae about two-thirds as long as the trochanters of the pedipalps; movable digit much stouter and also longer than the fixed one; spinneret rather large, about two-thirds as long as the finger upon which it is situated, with six spine-like processes toward its tip, the two distal of which are the largest and are curved outward. On its inner distal margin the movable digit is provided with an inwardly directed, curved claw and an anteriorly directed, straight, sharp spine about twice as long as the curved claw.

Pedipalps stout; longer than the body; trochanter subglobose and a little over one-half as long as the femur; femur with short pedicel, narrowest near its middle; external margin of femur strongly convex, internal margin concave for its distal one-half; tibia about as long as femur, but broader, swollen on its inner side and almost evenly convex on its outer side; hand as long as the fingers, the latter stout, provided with a distal claw; teeth, large and sharp. All the parts of the pedipalp except the fingers clothed with short, stout, but not clavate hairs; fingers with many short but more tapering hairs and with about six long tactile bristles. The hairs of the fingers arise from minute tubercles, and in this respect differ from those of most species of the genus.

Cephalothorax two-thirds as broad as long, with two indistinct indications of segmentation and apparently without eyes.

Abdomen twice as long as broad; last scutum undivided; all the scuta well and evenly tuberculate, and sparsely clothed with short clavate hairs, except at its tip where the hairs are a little longer and not clavate.

Legs medium in size, last pair just reaching the posterior margin of abdomen.

Length, 2.50 mm.; breadth, 1.25 mm.

Female very similar, but apparently a little smaller than the male.

Chelanops floridae Balzan (Pl. III, Fig. 10).

Several specimens of this species are in the Cornell Collection. They were obtained by P. B. Powell from under the bark of a dead pine at Lake Lucy, Fla. This species strongly resembles *C. latus* Banks, to which I at first referred it. A specimen sent to Banks, however, was pronounced by him to be not his *latus* but *C. floridae* Balzan. I have figured the right pedipalp.

Chelanops pallidus Banks (Pl. III, Fig. 11).

The figure given of the right pedipalp of this species is made from a specimen that agrees perfectly with one thus determined for me by Banks as his *pallidus*. This species has not been figured before.

Chelanops sanborni (Hagen) (Pl. III, Fig. 12).

Hagen's description of this species is so inadequate that the species should be entirely redescribed, but since I have only three specimens and one of these is immature, I here give only a figure of one of the pedipalps.

Obisium brunneum Hagen (Pl. III, Fig. 13).

As no figure has been published of this species one is given in this paper. This is a common species in the northern states. Banks agrees with my determination of my specimens.

Blothrus magnus, new species (Pl. IV, Fig. 14).

A very large species. Color of cephalothorax and pedipalps reddish brown; abdomen and legs almost white; dorsal plates of the abdomen somewhat darker.

Chelicerae large, about two-thirds as long as the cephalothorax; digits rather long and only moderately curved; teeth large; spinneret a small, light brown tubercle; about as broad as long. Pedipalps large, long and strong; trochanter about as long as the chelicerae, not swollen and possessing a very small tubercle on its posterior margin near the distal end; femur almost as long as the cephalothorax plus the mandibles, gradually increasing in width as you pass from the base to the tip; tibia almost as long as the femur, with a

long slightly curved pedicel which is equal to about one-third the total length of the segment, pedicel slightly convex on the outer side, but more strongly concave on the inner side; hand shorter than the tibia, its pedicel prominent, as long as broad; fingers a trifle longer than the hand and curved inward toward their tips. All the segments of the pedipalps sparsely clothed with rather long simple hairs, some of these hairs are as long as the width of the femur.

Cephalothorax rectangular, distinctly longer than broad. Eyes absent, also the eye pits. The edges of the cephalothorax are slightly concave at their anterior ends, just posterior to this slight concavity there is a prominent simple hair: anterior margin of cephalothorax slightly convex.

Abdomen much longer than the cephalothorax; dorsal plates very thin, smooth and hairless. The whole abdomen is apparently without any hairs.

Legs rather slender. When the front pair is extended reaching beyond the tip of the chelicerae by half their length; posterior pair stouter than the rest and when extended backward reaching the tip of the abdomen; femur of the last leg almost twice as broad as the tibia.

Length 4 mm.; breadth 1 mm.

Described from a single specimen in the Cornell Collection, lot no. 342. It was collected at Shasta Springs, Calif. This is the second species of this genus to be recorded from the United States.

***Chthonius longipalpus* Banks** (Pl. V, Fig. 15).

This species is extremely abundant around Ithaca, N. Y. If one will turn up most any old log, or an old piece of wood, or a flat stone during the fall of the year, he will seldom fail to find one or more of these pseudoscorpions. They are very curious little creatures, and when disturbed throw back their long "pinchers," held wide open in an attitude of defense. Since they are so very small creatures such fruitless actions seldom fail to produce both amazement and laughter on the part of those who have thus accidentally intruded upon their premises. A drawing of the species is here the first time given.

LIST OF SPECIES EXAMINED, WITH THEIR SITUATIONS AND
LOCALITIES.

Fam. CHELIFERIDÆ.

Gen. CHELIFER.

***Chelifer cancroides* Linn.** Faun. Suec., ed. XXI, 345, 1767.

1. Portage, Wisconsin. Several specimens from under the bark of a conifer. Collected Sept. 1 and 2, 1909, by myself.

2. Ames, Iowa. Scores of individuals found in various situations. A colony of them found under the bark of *Quercus alba*. Collected at various times in 1909 and 1910 by the writer.
3. Ithaca, New York. Several specimens from various situations. Cornell University Collection.
4. Borodino, New York. Two specimens from a bee-hive. Cornell University Collection.
5. Otto, New York.. A large number of individuals taken from under a barn floor. Collected by Professor Comstock: Cornell University Collection.
6. Columbia, Missouri. An abundance of material but no situation given. Collected by C. R. Crosby: Cornell University Collection, lot 305.
7. Havana, Illinois. Several individuals from under the bark of trees standing in shallow water of the Illinois River. Collected by the writer Aug. 9, 1908.
8. Urbana, Illinois. Various individuals from different situations. Collected by Dr. J. W. Folsom and by the writer.
9. Arcola, Illinois. Four specimens from under bark and one in a dwelling house. Collected by the writer.
10. Marshall, Illinois. Several specimens collected under the bark of oaks by the writer in 1908.
11. Farrington, Illinois. Several specimens from under bark. Collected by the writer, Apr. 10, 1909.
12. Xenia, Ohio. Several specimens from under bark. Collected by the writer, Sept. 14, 1910.
13. Austin, Texas. Two specimens, situation not known. Collected by Prof. Comstock in the spring of 1903.
14. Albuquerque, New Mexico. One specimen without situation. Collected by E. J. Osler, Sept. 10, 1903. Cornell University Collection, lot 248.
15. Palo Alto, California. A single specimen, no situation. Cornell University Collection, lot 305.
16. San Mateo, California. Seven specimens, no situation given; collected Nov. 4. Cornell University Collection.

Gen. **CHELANOPS.**

Chelanops pallidus (Banks). Can. Ent., XXII, p. 152.

1. Ithaca, New York. Two specimens, one found hanging to the leg of a house-fly. One specimen collected by the writer, the other is in the Cornell University Collection.
2. Arcola, Illinois. Several individuals taken from under bark. Collected by the writer in 1908 and 1909.
3. Marshall, Illinois. Two specimens from under the bark of living oaks, and one from under the bark of a log. Collected by the writer in the fall of 1908.

Chelanops corticis, new species.

1. Havana, Illinois. Two specimens from under bark of trees standing in water. Collected by the writer Aug. 9, 1908.
2. Urbana, Illinois. Two specimens, situation unknown. Collected by Dr. J. W. Folsom in March, 1902.

Chelanops floridæ Balzan. Ann. Soc. Ent. Fr., 1891, p. 524.

1. Lake Lucy, Florida. Several specimens from under bark of dead pine. Collected by P. B. Powell, Feb. 25, 1907. Cornell University Collection.

Chelanops sanborni (Hagen). Record Am. Ent., 1868, p. 51.

1. Muncie, Illinois. One specimen from moss. Collected by the writer June 16, 1908.
2. Urbana, Illinois. One specimen from under a log. Collected by the writer July 27, 1908.
3. Ithaca, New York. Two specimens, no situation given. Collected May, 1902. Cornell University Collection.

Chelanops oblongus Say. Acad. Phila., II, p. 64.

1. Muncie, Illinois. One specimen from under bark. Collected by the writer June 16, 1908.
2. Urbana, Illinois. One specimen from under the bark of a log. Collected by J. W. Folsom, Aug. 19, 1909.
3. Marshall, Illinois. Two specimens from under the bark of logs. Collected by the writer Feb. 6, 1909.
4. Ithaca, New York. Many specimens, but no situations given. Collected by J. O. Martin. Cornell University Collection.

Fam. IDEOBISIIDÆ.

Gen. **IDEOBISIUM.****Ideobisium rufulum (Banks).** Can. Ent., XXIII, p. 166.

1. Covington, Virginia. Many specimens. Collected by C. R. Crosby, Sept., 1905. Cornell University Collection.

Fam. OBISIIDÆ.

Gen. **OBISIUM.****Obisium brunneum Hagen.** Rec. Amer. Ent., 1868, p. 52.

1. Ames, Iowa. One specimen under an old piece of wood. Collected by the writer Sept. 11, 1909.
2. Cambridge, Mass. One specimen, no situation given. Collected by C. R. Crosby. Cornell University Collection.

Gen. **BLOTHRUS.****Blothrus magnus, new species.**

1. Shasta Springs, California. One specimen. Collected in July, 1902. Cornell University Collection, lot 342.

Gen. **CHTHONIUS.****Chthonius longipalpus Banks.** Can. Ent., XXIII, p. 164.

1. Ithaca, New York. Several specimens from under stones. Collected by the writer during the fall of 1910.
2. Woods Holl, Mass. Three specimens. Collected by J. E. Guthrie.
3. District of Columbia. One specimen, no situation given. Cornell University Collection, lot 241.

Chthonius pennsylvanicus Hagen. Rec. Amer. Ent., 1868, p. 52.

1. Minneapolis, Minn. One specimen from under damp bark on river bluffs. Collected by J. E. Guthrie, Apr. 24, 1900.
2. Hillery, Illinois. One specimen from moss. Collected by C. A. Hart and J. Zetek, March 4, 1908.

Chthonius moestus Banks. Can. Ent., XXIII, p. 165.

1. Columbia, Missouri. Several specimens. Collected by C. R. Crosby during the month of March. Cornell University Collection.

EXPLANATION OF PLATES.

PLATE I.

Fig. 1. *Chelifer cancroides* Linn. Dorsal view of female, $\times 26$. This figure represents an individual about midway between the extremes of variation.

PLATE II.

Fig. 2. *Chelifer cancroides* Linn. Dorsal view of chelicera, pedipalps, and the anterior part of abdomen of male, $\times 26$. This figure was drawn from a specimen collected at Ames, Ia. It should have the varietal name of *nigripalpus* n. var.

Fig. 3. *Chelifer cancroides* Linn. Dorsal view of the chelicera, pedipalp, and the anterior part of the abdomen of male, $\times 26$. Figure made from specimens collected under a stable floor at Otto, N. Y. It should have the varietal name of *dentatus* n. var.

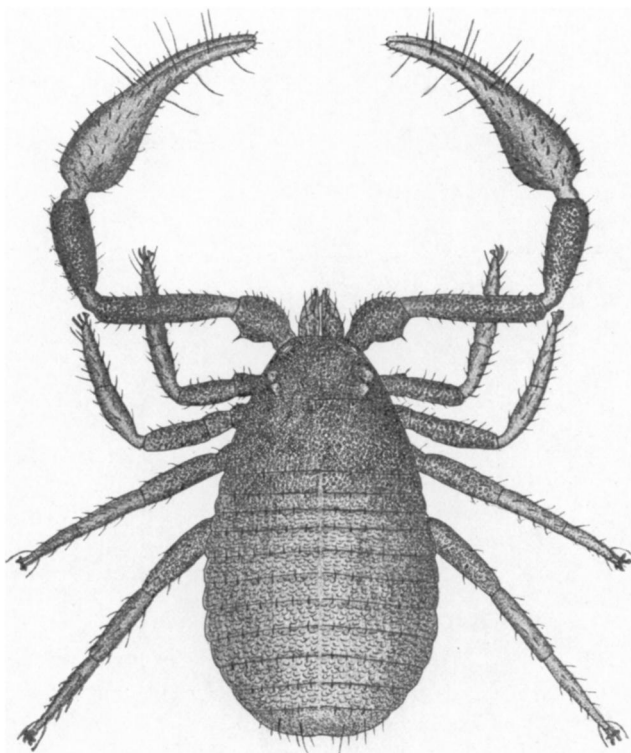
Fig. 4. *Chelifer cancroides* Linn. Dorsal view of the chelicera, pedipalp, and the anterior part of the abdomen of male, $\times 26$. Individuals with the characters shown in this drawing have gone under the specific name of *C. scabriculus* Simon, but they should be considered only as constituting a variety of *C. cancroides* Linn.

Fig. 5. *Chelifer cancroides* Linn. Movable digit of chelicera, from above, $\times 260$.

Fig. 6. *Chelifer cancroides* Linn. Posterior part of cephalothorax and anterior part of abdomen of male, $\times 26$. Drawn from a bark specimen from Xenia, O.

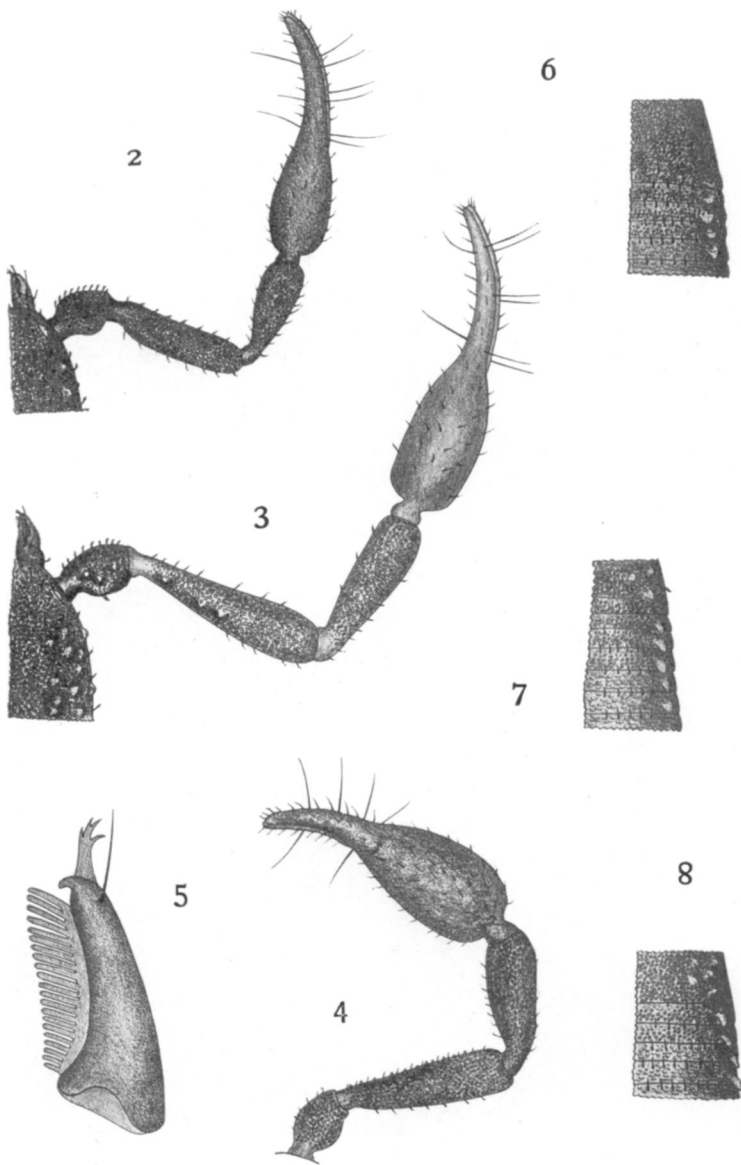
Fig. 7. Same as Fig. 6 except the specimen from which the drawing was made was taken from under bark at Havana, Ill.

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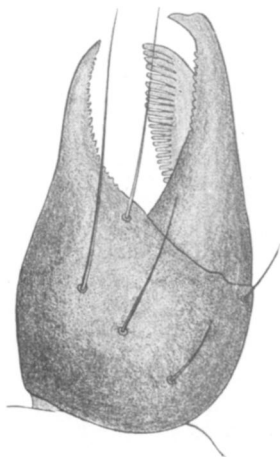
H. F. EWING *ad nat. del.*

Chelifer cancroides Linn.

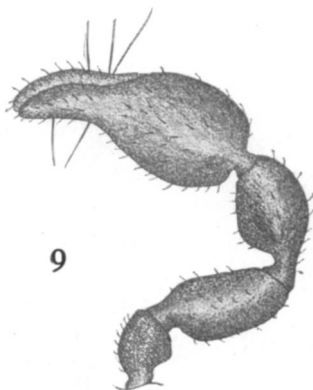


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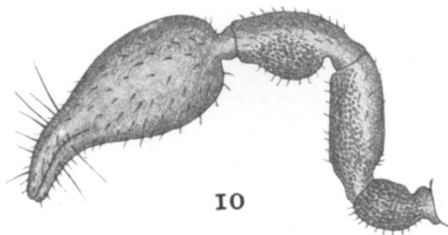
Chelifer cancroides Linn.



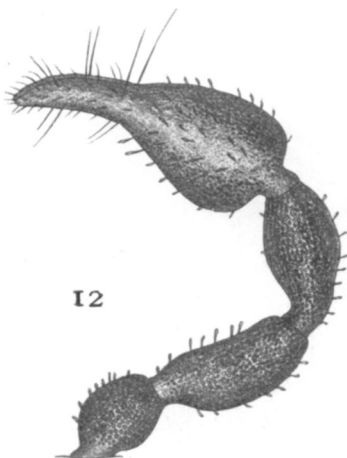
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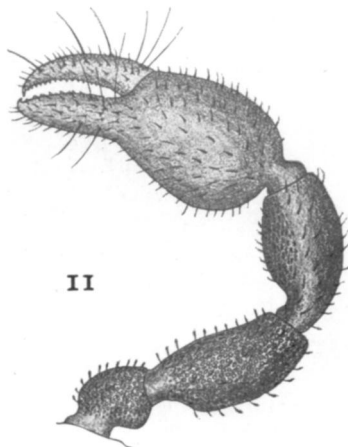
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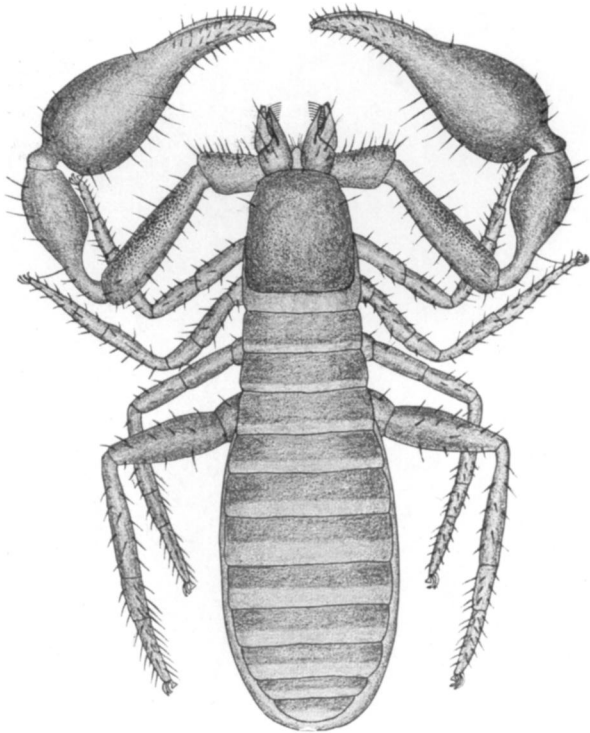


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H. E. EWING *ad nat. del.*

Chelanops and Obisium.

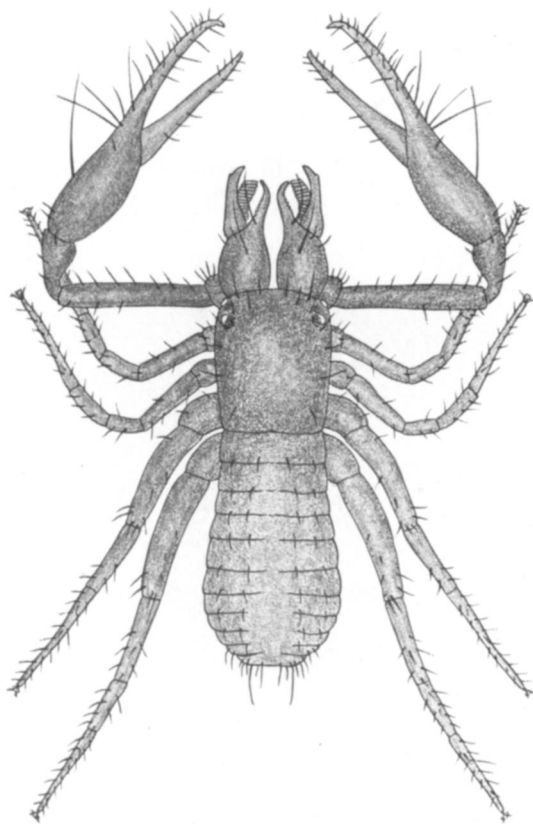
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H. E. EWING *ad nat. del.*

Blothrus magnus sp. nov.

15



H. E. EWING *ad nat. del.*

Chthonius longipalpus Banks.

Fig. 8. Same as Fig. 6 except the specimen from which the drawing was made was taken from a dwelling house at Arcola, Ill.

PLATE III.

- Fig. 9. *Chelanops corticis* sp. nov. Right pedipalp from above, $\times 26$.
Fig. 10. *Chelanops floridæ* Balzan. Right pedipalp from above, $\times 26$.
Fig. 11. *Chelanops pallidus* Banks. Right pedipalp from above, $\times 40$.
Fig. 12. *Chelanops sanborni* (Hagen). Right pedipalp from above, $\times 40$.
Fig. 13. *Obisium brunneum* Hagen. Right chelicera from above, $\times 260$.

PLATE IV.

- Fig. 14. *Blothrus magnus* sp. nov. Dorsal view, $\times 18$.

PLATE V.

- Fig. 15. *Chthonius longipalpus* Banks. Dorsal view of female, $\times 22$.

ADDITIONAL NEW SPECIES OF NORTH AMERICAN LEPIDOPTERA.

BY WM. BARNES, M.D., AND J. McDUNNOUGH, PH.D.,

DECATUR, ILL.

Family NOTODONTIDÆ.

Schizura biedermani, new species.

Male.—Head and thorax dark purplish-gray with decided reddish tinge on pro- and metathoracic tufts; posterior portion of patagia bordered with black; abdomen dorsally light yellow brown with darker tuft on first segment, beneath light purplish-gray; femora clothed with dark purple hairs. Primaries, ground color olivaceous brown, only apparent on lower portion of wing, costal half shaded with purplish, very dark at base of wing, much lighter, almost gray, towards apex; fine black basal dash, extending below cubital vein to t.a. line; subbasal line distinct, black, geminate, extending only to anal vein; t.a. line geminate, slightly lunulate, indistinct in costal portion, inwardly angled on anal vein; at end of cell a thin black bar, slightly concave outwardly, with a black dash extending from its center to t.p. line; indistinct curved blackish median shade, rarely extending completely across wing, half way between end of cell and t.p. line; t.p. line indistinct in costal portion, composed of a series of incurved light ochreous lunules, shaded with blackish towards base of wing, and followed outwardly by suffused reddish shading; apex light purplish-gray with black apical dash; series of more or less distinct submarginal black dashes, bordered outwardly with whitish; veins in outer portion of wing shaded with